



*International Civil Aviation Organization*

**EIGHTEENTH MEETING OF THE COMMUNICATIONS/NAVIGATION  
AND SURVEILLANCE SUG-GROUP (CNS SG/18) OF APANPIRG**

Asia and Pacific Regional Sub-Office, Beijing, China  
(21 – 25 July 2014)

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**Agenda Item 5:           Aeronautical Mobile Service**

**SATVOICE COMMUNICATION IN THE AUCKLAND (NZZO) OCEANIC FIR**

(Presented by New Zealand)

**SUMMARY**

This paper presents a summary of ISPACG/28 discussions on SATVOICE and the SATVOICE guidance material.

**1.       INTRODUCTION**

1.1           The CNS SG, at its Seventeenth Meeting, reviewed the amendment to the Satellite Voice Guidance Materail (SVGGM) proposed by the NAT Region, but deferred its endorsement of the amendment until it had been reviewed by OPLINKP. OPLINKP had previously proposed that the SVGGM should be adopted as an ICAO Document.

1.2           The Informal South Pacific ATS Coordinating Group (ISPACG), at its meeting in March 2014, discussed the status of both the SVGGM and SATVOICE operations.

**2.       DISCUSSION**

2.1           ISPACG/28 discussed papers from Airways New Zealand on the use of SATVOICE in the Auckland Oceanic FIR (NZZO) and from the FAA on the status of SATVOICE operations and of the work of OPLINKP on the SVGGM. Both papers are attached.

2.2           The Airways paper describes the operational issues that have been encountered using the Iridium, MTSAT and Inmarsat services. The Iridium ATS Safety Voice Service requires the ATS user to call an Iridium access number and then enter a discreet User ID and PIN followed by the call priority and the ICAO 8-digit octal aircraft identifier. While MTSAT is used for CPDLC and ADS-C, access is not provided (by the CSP) for SATVOICE. Airways experienced difficulty calling some Inmarsat-equipped aircraft as a result of the introduction of the Inmarsat I3 GES, when Inmarsat took back control of the I3 GES operations from the previous GES operators. ANSPs and aircraft operators now require a contract with either SITA or ARINC.

2.3 The paper from the FAA noted that the OPLINKP was targeting 4Q 2014 for publishing the SVGM as an ICAO Doc and was investigating the need for amendments to annexes, such as Annex 10 Vol III, and PANS. The PARC CWG had established a team to resolve issues with using the Iridium ATS Safety Voice service. The paper also noted ANSP's problems with managing SATVOICE numbers, challenges for developing MMEL policy and requirements for operators using the iridium service.

### **3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.

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Attachment A: ISPACG/28 WP/03 - Satellite Voice in the Auckland (NZZO) Oceanic FIR

Attachment B: ISPACG/28 IP/07 - Satellite Voice (SATVOICE) for Air Traffic Services (ATS) Communication

**Twenty Eighth Meeting of the  
Informal South Pacific ATS Co-ordinating Group  
(ISPACG/28)**

**Papeete, Tahiti  
5-7 March 2014**

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**Agenda Item 4: Open Action Items AI 27-1**

**Satellite Voice in the Auckland (NZZO) Oceanic FIR**

**Presented by Airways New Zealand**

**SUMMARY**

This paper provides an update on Satellite Voice implementation in the Auckland (NZZO) Oceanic FIR. It discusses the early stages of implementation of the Iridium Safety Voice service and the availability of satellite voice services through Inmarsat and MTSAT.

**1. INTRODUCTION**

- 1.1 Airways have been providing satellite voice communication services to aircraft equipped with Inmarsat satellite voice using Astrium as the access provider and are in the early stages of testing the Iridium ATS (Air Traffic Service) Safety Voice Service. Airways do not provide satellite voice communication services to aircraft operating on MTSAT. At some stage since the introduction of the new Inmarsat I3 GES we have lost the ability to access Inmarsat equipped satellite voice aircraft via our Astrium access number.

**2. DISCUSSION**

**Iridium**

- 2.1 Airways New Zealand received their user ID and PIN to enable calling via the Iridium ATS Safety Voice Service in early February 2014. Access to SATVOICE services is described in Paragraph 2.6 of the Satellite Voice Guidance Material (SVGGM). The ATS Safety Voice Service requires the ATS caller to call an Iridium access number then enter a discrete User ID and PIN followed by required call priority and then the 8-digit octal ICAO number for the aircraft which is derived from the hex representation of the ICAO 24 bit code in the aircraft flight plan.

- 2.2 Unique ATS SIM cards are required on the aircraft to enable use of the ATS voice service. These ATS SIM cards are different from the Iridium SIM cards installed on many aircraft that take Iridium satellite voice calls without the caller identification and priority pre-emption available with the ATS Safety Voice Service.
- 2.3 Initial testing with an airline customer that is implementing Iridium satellite voice for ATS communications has identified that the aircraft were not issued with ATS SIM cards by their CSP and are not accessible through the ATS safety voice service. The operator was not aware of the need for specific ATS SIM cards to enable use of the Iridium ATS safety voice service. We are currently identifying if other aircraft operating in NZZO and filing M3 in the FPL are operating with the Iridium Safety Voice service. We have confirmed that at least one fleet is not.
- 2.4 The intention is to incorporate satellite voice access into the Oceanic Control System and the air ground operator workstations. It is planned that this automation will use the ICAO CODE/ to determine the 8-digit octal ICAO number used with the ATS Safety Voice Service. A FPL sample has shown some issues that will need to be addressed by automation assumptions, further guidance material, and in the New Zealand AIP. For example:
- Some aircraft operating in NZZO are equipped with both Inmarsat and Iridium Satellite Voice and automation will be required to allow controller selection and/or a default priority. One suggestion is that if Inmarsat CPDLC is indicated in FPL then we would default to Iridium for Satellite Voice. This will require coordination with operators as one operator has advised they only use Iridium in Polar Regions above 80N.
  - Some aircraft are filing both CODE/ and COM/ with a 12 digit Iridium access number. The 12 digit number identifies that they are not using the ATS Safety Voice Service. The use of COM/ to identify Iridium satellite voice access availability other than via the ATS Safety Voice Service is not covered in the SVGM Flight planning paragraph 3.4 and has implications in regard to MEL relief.
  - With the recent introduction of Iridium ATS Safety Voice Service in late 2013 automation will assume that aircraft filing CODE/ and M3 in Item 18 are using the ATS Safety Voice Service. One fleet that is filing CODE/ and M3 has advised they have not yet upgraded to the ATS safety voice service.
  - Some aircraft that are filing M3 for Iridium satellite voice in Item 10 of the FPL are not providing either CODE/ or COM/ in Item 18. This will be addressed with individual operators.

### **MTSAT**

- 2.5 One airline fleet operating in NZZO is using MTSAT SATCOM for both CPDLC and satellite voice communications. SITA is the designated Communication Service Provider for MTSAT however they advised Airways New Zealand in 2013 that they do not provide access for satellite voice communications calls to aircraft via MTSAT.

### **Inmarsat**

- 2.6 Controllers can call aircraft using Inmarsat satellite voice via an access terminal adjacent to their controller workstation. This terminal automates the dialing sequence to an access number in the United States provided by Astrium (previously known as the Vizada SAT Direct service). The controllers input the aircraft registration and a database look up determines the aircraft number and dials the Inmarsat access number, PIN, aircraft number, and call priority.
- 2.7 At some stage since the transition to the new Inmarsat I3 GES in July 2013 we have lost the ability to call Inmarsat equipped satellite voice aircraft. Inmarsat have taken direct control of the I3 GES operations back from the previous GES operators e.g. Astrium (Vizada) and now contract directly with SITA and ARINC for access to both FANS1/A ACARS and voice services. We have been advised that the internetworking between Inmarsat and Astrium was kept open after the transition to enable Astrium customers to transition to a new supplier. However, Airways was never advised nor did we pick up on the impact of the I3 change on our satellite voice access. We are working through this now but suspect we may need to change provider.
- 2.8 Our intention is to incorporate the satellite voice automation into the OCS controller and air ground operator work stations by 2016. Provision will be made to use the filed FPL CODE in Item 18 instead of a database to determine aircraft phone numbers.

### **3. ACTION BY THE MEETING**

- 3.1 The meeting is invited to:
- a) Note the issues identified during implementation of the Iridium Safety Voice service in NZZO; and
  - b) Note the adventitious impact of the I3 upgrades on our Inmarsat satellite voice communications; and
  - b) Discuss if further guidance material is required.

**Twenty Eighth Meeting of the  
Informal South Pacific ATS Co-ordinating Group  
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**Papeete, Tahiti  
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**Agenda Item 4: Review Open Action Items (AI 27-1)**

**Satellite Voice (SATVOICE) for Air Traffic Services (ATS) Communication**

**Presented by Federal Aviation Administration**

**SUMMARY**

This paper provides background and an update on the status of satellite voice (SATVOICE) for air traffic services (ATS) communication.

**1 INTRODUCTION**

- 1.1 At ISPACG/27 FIT/20, the FAA provided information on the Communication Working Group (CWG), operating under the auspices of the FAA-sponsored Performance Based Operations Aviation Rulemaking Committee (PARC), which included a project to evaluate the use of satellite voice (SATVOICE) for ATS communication.
- 1.2 This paper provides a review and update of the PARC CWG SATVOICE project; information on the work completed by the Inter-Regional SATCOM Voice Task Force (IRSVTF), established by the North Atlantic Systems Planning Group (NAT SPG) and the Asia-Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG), at the request of the Air Navigation Commission (ANC); and related work by the Operational Data Link Panel (OPLINKP).

**2 DISCUSSION**

**2.1 PARC CWG Project Overview**

- 2.1.1 In March 2008, the PARC CWG/14 initiated a project to investigate the use of SATVOICE for ATS communication. The goal of the project, which is still ongoing, is to conclude on recommendations to the FAA that would allow one HF communication system to be permanently replaced with a SATVOICE system in cases where two long range communication systems (LRCSs) are required. The recommendations would concern FAA policies and practices that are applied to the master minimum equipment list (MMEL) for a specific aircraft model and the minimum equipment list (MEL) for a specific operator.

2.1.2 The PARC CWG SATVOICE project is investigating Inmarsat, MTSAT and Iridium SATVOICE communication capabilities to determine their viability as a FAA-approved LRCS. The project included the development of a document that contained guidance material and required communication performance (RCP) and required surveillance performance (RSP) specifications. The RCP and RSP specifications were intended to characterize acceptable performance of a LRCS within a performance-based framework and to provide criteria for aircraft equipment, infrastructure and procedures.

## **2.2 Inter-Regional Satellite Voice Task Force and other regional activity**

2.2.1 In June 2010, the NAT SPG (Conclusion 46/5) and the APANPIRG (Conclusion 21/27), at the request of the ANC, established the IRSVTF to develop globally applicable guidance material for the use of SATVOICE for ATS communication. The IRSVTF was to complete its task in December 2011.

2.2.2 In May 2011, the ICAO Council approved the *North Atlantic (NAT) Supplementary Procedures* (Doc 7030/5) amendment, which permitted the use of SATVOICE for ATS communication.

2.2.3 In January 2011, the PARC CWG had offered its draft document to the IRSVTF/1 as a starting point for further development of globally applicable guidance material for the use of SATVOICE for ATS communication. This draft document provided a compilation of guidance material from various sources, including guidance material from the NAT SATCOM Voice Task Force in support of a SATVOICE trial conducted in the NAT Region from 2005 to 2008. The IRSVTF/1 had accepted the document as a relevant source for completing its task.

2.2.4 On 24 July 2012, the IRSVTF issued the *Satellite Voice Guidance Material (SVGGM)*, First Edition. The SVGGM, First Edition, includes guidance material for SATVOICE service provision, operator preparation and aircraft equipage, controller and flight crew procedures, RCP and RSP specifications, and post-implementation monitoring.

2.2.5 The SVGGM is intended to promote global harmonization of SATVOICE services when the:

- a) Aeronautical information publication (AIP), or other publication as appropriate, notifies airspace users of available SATVOICE service; and
- b) Operator seeks MEL relief of one HF communication system based on a SATVOICE system.

2.2.6 In September 2012, the APANPIRG/23 adopted the SVGGM (Conclusion 23/25 refers). In addition, the APANPIRG recalled that, since the 1990s, the aeronautical mobile service (AMS) strategy for the Asia-Pacific Region restricted the use of SATVOICE to non-routine and emergency purposes. However, India and some other States had indicated they were permitting SATVOICE in place of one HF. IATA had mentioned that SATVOICE implementation involved cost to the operators. Therefore, the APANPIRG tasked its Communication, Navigation and Surveillance Sub-Group

(CNS SG) to review and update the AMS strategy for use of SATVOICE in the Asia/Pacific Region.

2.2.7 In November 2012, the NAT Implementation Management Group (NAT IMG/41), on behalf of the NAT SPG, endorsed the SVGGM (NAT SPG Conclusion 48/8 and NAT IMG Decision 41/11 refers). However, the NAT IMG/41 report included some proposed changes for global coordination as a proposed amendment to the SVGGM, First Edition.

2.2.8 In June 2013, APANPIRG/24 meeting discussed items related to SATVOICE. The following summarizes the outcomes:

- a) Concerning the proposed changes to SVGGM by the NAT IMG/41, noted in paragraph 2.8, the APANPIRG noted the review of the proposed changes by the CNS SG. The APANPIRG accepted the CNS SG's decision to defer endorsement based on the OPLINKP agreement that the SVGGM would be reviewed in its entirety and revised, accordingly, with the aim of becoming an ICAO document; and
- b) Concerning the CNS SG task to update the AMS strategy, noted in paragraph 2.7, APANPIRG adopted Conclusion 24/35, Revised Regional AMS Strategy, which includes:

The AMS strategy for the Asia/Pac Region is to:

...

- g) retain [high frequency] HF voice for communication in areas where [very high frequency] VHF coverage is not available;
- h) provide satellite voice (SATVOICE) where appropriate. States providing SATVOICE service should publish relevant details in their AIP;
- i) plan for enhanced AM(R)S and AMS(R)S applications within a performance-based communication and surveillance (PBCS) framework;
- j) plan and implement new communication technologies and applications to meet the demands of aviation in the ASIA/PAC Region with the involvement of all stakeholders and taking account of costs and benefits; and

...

## 2.3 Operational Data Link Panel

2.3.1 The IRSVTF was only charged with developing satellite voice guidance material. However, it recognized that the OPLINKP, which includes SATVOICE in its work program, may need to consider amendments to annexes and procedures for air navigation services (PANS) to refer to the SVGGM and support SATVOICE implementation.

2.3.2 In March 2013, the OPLINKP/WG/1 agreed that the SVGGM should be converted to an ICAO document with its own document number. The OPLINKP reviewed the



proposed changes provided by NAT IMG/41 and concluded that some of the proposed changes were region-specific. Furthermore, it appeared that other changes were needed before SVGGM could be accepted as an ICAO document. Therefore, OPLINKP agreed that the SVGGM would be reviewed in its entirety. Following the March meeting, the Secretariat distributed the draft Doc-[SVGGM] to OPLINKP members and advisors for comment.

2.3.3 In October 2013, the OPLINKP/WG/WHL/6 reviewed the comments received on Doc-[SVGGM] (refer to OPLINKP/WG/WHL/6 WP/3). The OPLINKP concluded to review:

- a) Examples to determine if they are needed and ensure they are consistent with existing ICAO provisions; and
- b) Controller and radio operator sections with objective to have them combined into one.

2.3.4 The OPLINKP is targeting 4<sup>th</sup> quarter 2014 for publishing Doc-[SVGGM].

2.3.5 The OPLINKP is still investigating the need for amendments to annexes, such as Annex 10, Volume III, and PANS.

## **2.4 Follow-on activities within PARC CWG**

2.4.1 In August 2013, the PARC CWG/30 reviewed the status of the SATVOICE project. The review covered the scope of the project, Iridium Safety Voice service and FAA policies and advisory circulars related to design approval, MMEL/MEL and operational use of SATVOICE for ATS communication.

2.4.2 The original scope of the project was to investigate ATS communication only via a radio operator using SATVOICE. However, at its last meeting, PARC CWG agreed to modify the scope that if appropriate parties wanted to participate in evaluations of direct controller pilot communication (DCPC) via SATVOICE, PARC CWG would consider these evaluations under the project.

2.4.3 The Iridium Safety Voice service platform is operational. However, existing aircraft systems require modification to access the Iridium Safety Voice service. To access the Iridium Safety Voice service, the aircraft system will require a new subscriber identity module (SIM) card to enable air route traffic control centers (ARTCCs) and aeronautical stations to make ground-to-air calls via a two-stage dialing process that uses the aircraft address (octal code) in the second stage. Currently, ARTCCs and aeronautical stations can only contact Iridium-equipped aircraft using direct dial commercial numbers contained in a local directory (e.g. database) and these calls are not routed through the Iridium Safety Voice service platform.

2.4.4 In addition to ensuring that calls are routed through the Iridium Safety Voice service platform, the SVGGM provides a standard approach for contacting aircraft via SATVOICE. Regardless of technology (Inmarsat or Iridium), the ARTCC or aeronautical station should be able to contact the aircraft from information filed in the flight plan. The operator must file the SATVOICE capability in Item 10 (e.g., M1,

M2 or M3) and file the aircraft address (in hexadecimal format) following CODE/ in Item 18 of the flight plan. With this flight plan information, the ground system can then determine the appropriate first and second stage dialing sequences needed to contact an aircraft. If the ground system uses a local directory that is not up-to-date, the ARTCC or aeronautical station may not have the information needed to contact the aircraft via SATVOICE.

- 2.4.5 Avionics suppliers are planning service bulletins to modify Iridium-equipped aircraft. These service bulletins are expected to be available around the beginning of 2014. However, these service bulletins include features other than just the SIM card change. The PARC CWG has formed a small team comprising an avionic supplier, a communication service provider, an operator and Iridium, as a minimum, to determine options to modify aircraft system with just a SIM card change to expedite operational use of the Iridium Safety Voice service. Other interested parties are also participating.
- 2.4.6 The PARC CWG is reviewing a draft revision to FAA MMEL policy letter (PL) 106, provided as **Attachment B** to this paper, which provides the FAA's MMEL requirements for HF communication systems. The revision:
- a) Introduces SVGM as a basis for considering a SATVOICE system – in place of one HF communication system – as a LRCS that may be available to certain equipped operators;
  - b) Clarifies that controller-pilot data link communication (CPDLC) alone is not suitable for non-routine and emergency communication and therefore not appropriate as a basis for MMEL/MEL relief of HF communication systems;
  - c) Removes any notes indicating that SATVOICE is to be used only as a backup to an HF communication system;
  - d) Includes requirements to update the flight plan to annotate operating equipment status onboard the aircraft (see paragraph 2.17); and
  - e) Notes that aircraft SATVOICE systems accessible via direct dial commercial numbers are not suitable for MMEL/MEL relief of HF communication systems.
- 2.4.7 The PARC CWG is reviewing a draft revision to FAA B045 Operational Specification, which allows a single LRCS in overwater operations, generally applicable in the Western Atlantic Route System (WATRS). The draft revision is intended to clarify the following:
- a) Code of Federal Regulations (CFR), section 91.511, allow only part 91 operators to operate [with no LRCS] over water with no more than a 30-minute gap in two-way radio VHF communication. CFR, section 91.501(a) states that operating rules under part 91 do not apply when required to operate under parts 121, 125, 129, 135, and 137;
  - b) CFR, sections 121.351(c), 125.203(f) and 135.165(g), allow for use of a single LRCS in certain geographic areas. A single LRCS may be acceptable depending on the ability of the flight crew to navigate the airplane along the route within the

degree of accuracy required for ATC, the length of the route being flown and the duration of the VHF communication gap; and

- c) VHF radio coverage above FL180 for Houston Oceanic and ARINC VHF Extended Range Network (VERN) qualifies as a LRCS.

- 2.4.8 Concerning operations where two independent LRCSs are required, such as for operations beyond a 30 minute VHF communication gap (refer to CFR, sections 121.351(a), 125.203(c) and 135.165(d)), the PARC CWG is coordinating with the FAA to clarify its policy that would allow aircraft with one HF system and one SATVOICE system to meet communication equipage requirements.
- 2.4.9 The PARC CWG is considering any revisions the FAA may plan for its advisory circulars (ACs) and technical standard orders (TSOs) that are relevant to SATVOICE aircraft equipment and installation (e.g., AC 20-150A, TSO C-159A).
- 2.4.10 The PARC CWG continues to cooperate with ICAO, governments and industry, to promote global harmonization of SATVOICE services for ATS communication, and contributes to overcome any challenges in reaching this goal.

## **2.5 Challenges for using SATVOICE for ATS communication**

- 2.5.1 For a number of reasons, mainly due to resource limitations and other priorities, it continues to become a challenge to complete ICAO documents related to SATVOICE for publication. While the target date for publishing Doc-[SVGM] is 4<sup>th</sup> quarter 2014, OPLINKP is still investigating Annex and PANS amendments to invoke the guidance material. These amendments are not expected before November 2016. Nevertheless, the ICAO regions continue to implement and use SATVOICE today.
- 2.5.2 FAA is reviewing its MMEL policy to allow one HF communication system and one SATVOICE system. Other States may also be reviewing their MMEL policies. However operators would still be bound by airspace requirements as provided in *Regional Supplementary Procedures* (Doc 7030) and State AIPs applicable on the route of flight. AIPs that place restrictions on the use of SATVOICE would need to be amended to be remove the restrictions before operators can benefit from aircraft configurations that rely on a SATVOICE system for relief of one HF communication system.
- 2.5.3 While State AIPs may indicate the availability of SATVOICE service in applicable airspace, the relevant ARTCCs and aeronautical stations may have a limited number of lines and dialing capability. Also, incoming calls may be routed to the controller via the site supervisor or they may be unattended, which may limit the efficiency of the SATVOICE service. The infrastructure may need to be upgraded to provide the appropriate level of SATVOICE service before the State could remove any restrictions from the AIP on the use of SATVOICE.
- 2.5.4 The PARC CWG is investigating the assignment and management of short codes for ARTCCs and aeronautical stations. The short codes should be independent of technology, provided in AIPs and published on aeronautical charts. It is uncertain

whether the AIPs and aeronautical charts provide the short codes in all cases of available SATVOICE service and avionics suppliers are also looking for a single source that can be used to support speed dial capabilities on the flight deck. A list of known short codes is provided in **Attachment A**.

- 2.5.5 Concerning the use of Iridium Safety Voice service, the service is ready for use. However suppliers still need to provide service bulletins to update avionics and operators will need to incorporate service bulletins into their fleets.

### **3 ACTION BY THE MEETING**

- 3.1 The meeting is invited to note the information in this paper.

**Attachment A – SATVOICE Short Code Directory – 10 September 2013**

STATE	FIR	Contact	SHORT CODE
AFGHANISTAN	KABUL	Kabul ACC (mobile number)	440101
ALBANIA	TIRANA	Tirana ACC	420101
ALGERIA	ALGIERS	Algiers ACC	460501
ANGOLA	LUANDA FIR	Luanda ATC/FIS	460301
AUSTRALIA	ADELAIDE TCU	Adelaide Approach/Radio	450301
AUSTRALIA	BRISBANE CENTRE	Brisbane ATC	450302
AUSTRALIA	MELBOURNE CENTRE	Melbourne ATC	450303
AUSTRALIA	PERTH TCU	Perth Terminal Control	450304
AUSTRALIA	SYDNEY	Sydney TCU	450305
BAHAMAS	NASSAU	Nassau Approach Control	430802
BAHAMAS	NASSAU	Nassau Flight Service Station	430801
BAHRAIN	BAHRAIN	Bahrain ACC/FIS/Approach	440802
BAHRAIN	BAHRAIN	Bahrain ACC/FIS/Approach	440801
BANGLADESH	DHAKA	Dhaka ACC	440501
BELGIUM	BRUXELLES	Brussels ACC	420501
BENIN	ACCRA	Cotonou ATC	460106
BOTSWANA	GABORONE	Gaborone ACC	460107
BRAZIL	ATLANTICO FIR	Atlantico ACC	471001
CANADA	ARCTIC RADIO	Arctic Radio	431610
CANADA	EDMONTON	Edmonton ACC	431601
CANADA	GANDER DOMESTIC	Gander Domestic	431602
CANADA	GANDER OCEANIC	Gander Oceanic	431603
CANADA	GANDER RADIO	Gander Radio	431613
CANADA	MONCTON	Moncton ATC	431604
CANADA	MONTREAL	Montreal ATC	431605
CANADA	NORTH BAY	North Bay ATC/Radio/Flight Service centre	431609
CANADA	TORONTO	Toronto ACC	431606
CANADA	VANCOUVER	Vancouver ACC	431607
CANADA	WINNIPEG	Winnipeg ATC	431608
CANARY ISLANDS	CANARIES FIR	Canaries ACC	424201
CAPE VERDE ISLANDS	SAL OCEANIC	Sal Oceanic ATC	461701
CHAD	N'DJAMENA (EAST)	N'Djamena ACC (East Sector)	467002
CHAD	N'DJAMENA (WEST)	N'Djamena ACC (West Sector)	467001
CHILE	PUERTO MONTT	Puerto Montt ACC	472503
CHILE	PUNTA ARENAS	Punta Arenas ACC	472504
CHILE	SANTIAGO	Santiago ACC	472505
CHINA	CHENGDU	Chengdu ACC	441202
CHINA	HONG KONG	Hong Kong ATC	441299
CHINA	KUNMING	Kunming ATC	441204
CHINA	LANZHOU	Lanzhou ACC	441205
CHINA	URUMQI	Urumqi ATC	441208
COLOMBIA	BARRANQUILLA	Barranquilla ACC	473001
COLOMBIA	BOGOTA	Bogota ACC	473002
CONGO	BRAZZAVILLE	Brazzaville Control	467602
CYPRUS	NICOSIA	Nicosia ATC	420901
DEMOCRATIC REPUBLIC OF THE CONGO	KINSHASA	Kinshasa ACC	467601
DENMARK	COPENHAGEN	Copenhagen ACC/APP	421901
DENMARK	SONDRESTROM up to FL195	Sondrestom FIS Centre	421902
DOMINICAN REPUBLIC	SANTO DOMINGO	Santo Domingo ACC	432702
ECUADOR	GUAYAQUIL	Guyaquil Center	473501
EQUATORIAL GUINEA	MALABO FIR	Malabo ATC	460109

STATE	FIR	Contact	SHORT CODE
ESTONIA	TALLINN	Tallinn ACC	427387
ESTONIA	TALLINN	Tallinn ATC	427388
ETHIOPIA	ADDIS ABABA	Addis Ababa ACC	462401
ETHIOPIA	ADDIS ABABA	Addis Ababa ACC	462402
FIJI	NADI	Nadi ACC/ Radio	452001
FRANCE	BORDEAUX	Bordeaux ATC	422701
FRANCE	BREST	Brest ATC	422702
FRANCE	MARSEILLE	Marseille ACC	422703
FRANCE	PARIS	Paris ACC	422704
FRANCE	REIMS	Reims ACC	422705
FRENCH GUIANA	CAYENNE-ROCHAMBEAU	Non-routine Flight Safety calls only	463101
FRENCH POLYNESIA	TAHITI	Tahiti ATC/Tower	422790
GERMANY	BREMEN	Bremen ATC/FIS/ALRS	421102
GERMANY	DUSSELDORF	Dusseldorf ACC	421103
GERMANY	FRANKFURT	Frankfurt ACC	421104
GERMANY	MUNICH	Munich ATC	421105
GERMANY	RHEIN	Karlsruhe Upper Airspace Centre	421106
GHANA	ACCRA	Accra ATC	462701
GREECE	ATHINAI	Athinai/ Makedonia ACC	423701
HONDURAS	CENTRAL AMERICAN	Honduras ATC	433401
HUNGARY	BUDAPEST	Budapest ACC	424301
ICELAND	ICELAND RADIO	Iceland radio	425105
ICELAND	REYKJAVIK (OAC Supervisor)	OAC (alternate sectors) Flight Safety Calls	425101
ICELAND	REYKJAVIK (OAC)	OAC (alternate sectors) Emergency Calls Only	425103
INDIA	AHMEDABAD	Ahmedabad ACC	441906
INDIA	BOMBAY (Mumbai)	Mumbai ATC	441901
INDIA	BOMBAY (Mumbai)	Mumbai ATC (Satphone)	441920
INDIA	CHENNAI FIR	Chennai Oceanic Control	441904
INDIA	DELHI	Delhi ACC	441903
INDIA	HYDERABAD	Hyderabad ACC	441909
INDIA	KOLKATA	Kolkata ACC	441902
INDIA	MADRAS (Chennai)	Chennai ACC	441905
INDIA	NAGPUR	Nagpur ACC	441907
INDIA	TRIVANDRUM	Trivandrum ACC	441908
IRELAND	SHANNON	ATC Shannon Control	425001
IRELAND/UNITED KINGDOM	SHANWICK AERADIO	Shanwick Radio	425002
ITALY	BRINDISI	Brindisi ACC	424701
ITALY	MILAN	Milan ACC	424702
ITALY	PADUA	Padua ACC	424703
ITALY	ROME	Rome ACC	424704
JAMAICA	KINGSTON	Kingston ACC	433901
JAPAN	FUKUOKA	Fukuoka Air Traffic Management Centre	443101
JORDAN	AMMAN	Amman Centre	443801
LIBYAN ARAB JAMAHIRIYA	TRIPOLI	Tripoli Centre	464201
LITHUANIA	VILNIUS	Vilnius ACC	427389
MADAGASCAR	ANTANANARIVO	Antananarivo Control /Antananarivo Information	464701
MALAWI	LILONGWE	Lilongwe ACC	465501
MALAYSIA	KOTA KINABALU	Kota Kinabalu ATC/FIS	453301



STATE	FIR	Contact	SHORT CODE
MALAYSIA	KUALA LUMPUR	Kuala Lumpur ACC	453302
MALDIVES	MALE	Male ATC	445501
MALTA	MALTA	Malta ACC	425601
MYANMAR	YANGON	Yangon ACC	450601
NAMIBIA	WINDHOEK	Windhoek ACC	465901
NAMIBIA	WINDHOEK	Windhoek ACC	465902
NEW ZEALAND	AUCKLAND OCEANIC	Auckland Oceanic Control	451201
NEW ZEALAND	NEW ZEALAND Domestic	New Zealand ATC Domestic	451202
NIGER	NIAMEY	Niamey ACC	465601
NIGERIA	KANO	Kano Control	465701
NIGERIA	LAGOS	Lagos Control	465702
NORWAY	BODO	Bodo ACC (Supervisor)	425705
NORWAY	BODO OCEANIC	Bodo ACC (Oceanic Controller)	425701
NORWAY	BODO OCEANIC	Bodo Radio (HF)	425702
NORWAY	OSLO	Oslo ATCC	425703
NORWAY	STAVANGER	Stavanger ACC	425704
PAKISTAN	KARACHI	Karachi ACC	446301
PAKISTAN	LAHORE	Lahore ACC	446302
PAPUA NEW GUINEA	PORT MORESBY	Port Moresby ATC	455301
PHILIPPINES	MANILA	Manila ACC	454801
PORTUGAL	LISBON	Lisbon ACC	426301
PORTUGAL	SANTA MARIA OCEANIC	Santa Maria Oceanic/Radio	426302
PORTUGAL	SANTA MARIA RADIO	Santa Maria Radio/Oceanic	426305
ROMANIA	BUCHAREST	Bucharest ACC	426401
RUSSIAN FEDERATION	BARNAUL	Barnaul ACC	427308
RUSSIAN FEDERATION	CHITA	Chita ACC	427313
RUSSIAN FEDERATION	CHULMAN	Chulman ACC	427315
RUSSIAN FEDERATION	KOLPASHEVO	Kolpashevo ATC/Radio	427328
RUSSIAN FEDERATION	MAGADAN	Magadan ACC	427336
RUSSIAN FEDERATION	MIRNY	Mirny ACC	427339
RUSSIAN FEDERATION	MOSKVA	Moskva ACC	427340
RUSSIAN FEDERATION	MURMANSK	Murmansk ACC	427341
RUSSIAN FEDERATION	NORILSK	Norilsk ACC	427343
RUSSIAN FEDERATION	NOVOSIBIRSK	Novosibirsk ACC	427344
RUSSIAN FEDERATION	OMSK	Omsk ACC	427348
RUSSIAN FEDERATION	PETROPAVLOSK-KAMCHATSKY	Petropavlosk-Kamchatsky ATC	427354
RUSSIAN FEDERATION	TIKSY	Tiksy ACC	427368
SAUDI ARABIA	JEDDAH	Jeddah ATC	440301
SAUDI ARABIA	JEDDAH	Jeddah ATC	440302
SENEGAL	DAKAR OCEANIC	Dakar ATC/FIS	466301
SEYCHELLES	SEYCHELLES	Seychelles ACC/FIS/Alerting	466401
SINGAPORE	SINGAPORE	Singapore ATC/HF	456301
SOMALIA	MOGADISHU	Mogadishu FIS centre	466601
SOUTH AFRICA	BLOEMFONTEIN	Bloemfontein ATC	460101
SOUTH AFRICA	CAPE TOWN	Cape Town ATC	460102
SOUTH AFRICA	DURBAN	Durban ATC	460103
SOUTH AFRICA	JOHANNESBURG	Johannesburg Oceanic ACC	460104
SOUTH AFRICA	PORT ELIZABETH	Port Elizabeth ATC	460105
SRI LANKA	COLOMBO	Colombo ACC	441701
SRI LANKA	COLOMBO	Colombo FIC	441702
SUDAN	KHARTOUM	Khartoum ACC	466201
SURINAME	PARAMARIBO	Paramaribo ATC/FIS/ Alerting	476501

STATE	FIR	Contact	SHORT CODE
SWEDEN	MALMO	Malmö ACC	426501
SWEDEN	STOCKHOLM	Stockholm ACC	426502
SWITZERLAND	SWITZERLAND FIR	Geneva ACC	426901
SWITZERLAND	SWITZERLAND FIR	Zurich ACC	426902
TAIWAN	TAIPEI	Taipei ACC	441290
THAILAND	BANGKOK	Bangkok ACC	456702
TOGO	ACCRA	Lomé ATC	460108
TRINIDAD & TOBAGO	PIARCO	Piarco ACC	436201
UKRAINE	KIEV	Kiev ACC	427396
UKRAINE	LVOV	Lvov ACC	427397
UKRAINE	ODESSA	Odessa ACC	427398
UKRAINE	SIMFEROPOL	Simferopol ACC	427399
UNITED ARAB EMIRATES	EMIRATES	Dubai Approach	447002
UNITED ARAB EMIRATES	EMIRATES	Emirates ATC	447001
UNITED KINGDOM	LONDON	D&D London Cell (military)	423202
UNITED KINGDOM	SCOTTISH	D&D Scottish Centre (military)	423203
UNITED KINGDOM/IRELAND	SHANWICK	Shanwick Oceanic	423201
USA	ANCHORAGE - ARTCC	Anchorage Aero Route Traffic Control Centre	436602
USA	NEW YORK - NAT	New York NAT Flight Safety calls	436695
USA	NEW YORK - WATRS	New York WATRS Flight Safety calls	436696
USA	NEW YORK OCEANIC - ARINC	ARINC HF Operator - NYC	436623
USA	OAKLAND OCEANIC - ARINC	ARINC HF Operator - SFO	436625
USA	OAKLAND OCEANIC - ATCC	Oakland Oceanic ATCC	436697
UZBEKISTAN	SAMARKAND	Samarkand ACC	427358
VIETNAM	HO CHI MINH	Ho Chi Minh ACC	457402
YEMEN	SANA'A	Sana'a ACC	447302
ZIMBABWE	HARARE	Harare ACC/FIS Approach	467902
ZIMBABWE	HARARE	Harare Tower	467901



**Attachment B – Draft FAA MMEL Policy Letter (PL)106, Revision 5 GC**

[Provided as a separated file]

**-END-**